U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Leavenworthia exigua* var. *laciniata* Rollins

COMMON NAME: Kentucky gladecress

LEAD REGION: 4

INFORMATION CURRENT AS OF: March 17, 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

___ New candidate
_X_ Continuing candidate
_X__ Non-petitioned
___ Petitioned - Date petition received:
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)?
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

___ Listing priority change
Former LP: ___
New LP: ___
Date when the species first became a Candidate (as currently defined):
___ Candidate removal: Former LPN: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
____U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
___ F – Range is no longer a U.S. territory.
___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.
___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY:
Kingdom Plantae, Phylum Anthophyta, Class Dicotyledoneae, Order Capparales, Family Brassicaceae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Kentucky: Bullitt and Jefferson Counties.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Kentucky: Bullitt and Jefferson Counties.

LAND OWNERSHIP:
The majority of land on which Kentucky gladecress occurs is privately owned. However, the variety occurs within one protected area in eastern Bullitt County - Pine Creek Barrens Preserve, a 45-hectare (110-acre) property owned and managed by the Kentucky Chapter of The Nature Conservancy (TNC). A second occurrence is located on McNeely Lake Park, one of Louisville Metro Parks' properties in southern Jefferson County.

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LEAD FIELD OFFICE CONTACT: Dr. Michael A. Floyd, 502-695-0468 (x102), mike_floyd@fws.gov

BIOLOGICAL INFORMATION:
Species Description
Kentucky gladecress is about 5 to 10 centimeters (2 to 4 inches [in]) in height with early leaves that are simple with a slender petiole (central stalk of the leaf) and mature leaves that are sharply divided, somewhat squarish at the ends (appear as disconnected pieces along the main leaf vein), and arranged as a rosette (circular cluster of leaves) (Evans and Hannan 1990, p. 5). The flowers are small (3 to 6 mm [0.11 to 0.24 in]), white to lilac in color with four petals, green rather than lavender sepals (the outer of two floral envelopes [leaves] that make up the flower), and leafless stems. The fruit is flat and pod-shaped. Leaves typically disappear by the time the plant is in fruit (Evans and Hannan 1990, p. 6).

Taxonomy
R. C. Rollins (1963, p. 75) described *L. exigua* var. *laciniata* as a new taxon in his monograph of the genus *Leavenworthia*. Rollins (1963, pp. 51, 75) stated that the rather extensive populations of *L. exigua* located in Bullitt County, Kentucky, approximately 241 kilometers (km) (150 miles) north of the Central Basin of Tennessee, exhibited certain distinguishing characteristics compared to populations in Tennessee, northern Alabama, and northern Georgia. The Kentucky plants which he described as *L. exigua* var. *laciniata* had longer styles (usually slender and elongate extension of the ovary), green instead of lavender sepals, and more sharply divided

leaves than the typical *L. exigua* var. *exigua*. Kral (1983, pp. 10-18) supported Rollins' recognition of the taxon as a distinct variety. Kartesz (1991, p. 449) recognized the variety by including it in his vascular flora checklist for the United States.

Habitat/Life History

Kentucky gladecress appears to be adapted to environments with shallow soils interspersed with flat-bedded, Silurian dolomite and dolomitic limestones, a geological formation that is not common in Kentucky (Rollins 1963, p. 5; Evans and Hannan 1990, pp. 8-9). The soil that forms on these outcrops is often only a few inches in depth and may be lacking in some areas over the horizontally bedded limestones (Rollins 1963, p. 5). Because of the thin soils and underlying limestones, these habitats are extremely wet from late winter to early spring and quickly become dry in May and June. The natural habitat for the variety is cedar glades (Baskin and Baskin 1981, p. 243), but the variety is also known from overgrazed pastures, eroded shallow soil areas with exposed bedrock, and areas where the soil has been scraped off the underlying bedrock (Evans and Hannan 1990, p. 8). The variety does not appear to compete well with other vegetation and is shade intolerant (Evans and Hannan 1990, p. 8). Its poor competitive abilities appear to stem from its inability to tolerate shading from other larger, faster growing species. Open glade habitats that are maintained in an early stage of plant succession appear to provide the most favorable and/or suitable habitat conditions for this variety (Evans and Hannan 1990, p. 14).

The variety is not restricted to any specific soil type (Evans and Hannan 1990, p. 8). It appears to be more dependent upon lack of soil (and plant competition) and proximity of rock near or at the surface. It occurs primarily in open gravelly soils around rock outcrops in an area of the Canyville-Crider soil association (Whitaker and Waters 1986, p. 16). Within this soil association, Kentucky gladecress occurs on the following mapped soil types: Caneyville-rock outcrop complex on 6 to 40 percent slope; Caneyville silt loam, 6 to 12 percent slope, eroded; Caneyville-Beasley-rock outcrop complex, 12 to 30 percent slope; Faywood-Beasley-rock outcrop complex, 25 to 60 percent slope; and Beasley silty clay loam, 6 to 12 percent slopes, severely eroded (Whitaker and Waters 1986, pp. 26-27, 29-31, 40-41; Evans and Hannan 1990, p. 8). Where Kentucky gladecress occurs on soils without bedrock near the surface, the soil is usually eroded to severely eroded with 25 to 100 percent of the original surface gone (Evans and Hannan, p. 8).

The Kentucky gladecress is a winter annual. Its seeds germinate in the fall (typically September), plants persist through the winter as rosettes, and flowering begins in late February to early March (Baskin and Baskin 1981, p. 246; Evans and Hannan 1990, p. 11). The fruit matures in May when habitats begin to dry out, and plants are generally gone by early summer (Kral 1983, p. 1). The cyclical moisture availability on the thin soils of glades and other habitats acts to limit the number of plant species that are able to tolerate these extremes. Consequently, very few other plants occur on the outcrops (Evans and Hannan 1990, pp. 9-10). Common associates of *L. exigua* var. *laciniata* include false garlic (*Northoscordum bivalve*), little skullcap (*Scutellaria parvula*), poverty dropseed (*Sporobolus vaginiflorus*), cedar glade violet (*Viola septemloba* var. *egglestonii*), and Canadian bluets (*Houstonia canadensis*) (Baskin and Baskin 1981, p. 245; Evans and Hannan 1990, p. 10). The area surrounding glade openings where soils

are deeper tend to have plants with prairie/barren affinities like little bluestem (*Schizochyrium scoparium*), hoary pocoon (*Lithospermum canescens*), birdfoot violet (*Viola pedata*), pale purple coneflower (*Echinacea pallida*), and tall gayfeather (*Liatris aspera*) (White 2004, p. 1).

Historical Range/Distribution

The only information on historical distribution was included in the original description by Rollins (1963, p. 75) based on a specimen collected from a cedar glade in Bullitt County, Kentucky. Rollins (1963, p. 75) also noted that an earlier specimen collected from an open field in Bullitt County in 1954 by H. A. Korfhage was also this taxon.

Current Range/Distribution

A Kentucky endemic, this taxon is currently known from only the northeast quarter of Bullitt County and extreme southeastern Jefferson County (Evans and Hannah 1990, p. 6; Jones 2005, p. 294; White 2004, p. 1). Populations of the Kentucky gladecress are disjunct from populations of the other two varieties of *L. exigua* that occur in Alabama, Georgia, and Tennessee (Rollins 1963, p. 51).

Population Estimates/Status

Long-term, quantitative monitoring data are unavailable for this taxon, but the Kentucky State Nature Preserves Commission (KSNPC) has recorded qualitative estimates of occurrence size and quality at three- to five-year intervals. These evaluations are used to rank each occurrence with respect to size and viability, condition of the habitat, and degree of threat. The following specifications are used to rank the occurrences:

> A (excellent estimated viability): 1,000 or more generally healthy, reproducing individuals in generally natural habitat; at least 5 acres of habitat supporting the occurrence is dominated by native vegetation with conditions conducive to the plant's persistence;
>
> B (good estimated viability): 500 to 1,000 generally healthy individuals, habitat generally natural in character but may be somewhat degraded; may be fewer than 5 acres of natural habitat, but with at least some potential for restoration; OR many thousands of plants in a nonnative habitat that could serve as a seed source for restoration;
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> C (fair estimated viability): 100 or more plants possibly up to 1000 individuals; habitat may be degraded with nonnative and undesirable plants present;
>
> D (poor estimated viability): 100 or fewer individuals and habitat need not have any native species (lawns, pastures, roadsides, etc.).

F – Field surveys failed to relocate the plants at the site

X – Occurrence is considered extirpated

Evans and Hannan (1990, pp. 9, 19-20) conducted the first range-wide survey for the variety and documented a total of 71 occurrences in Bullitt and Jefferson Counties. At that time, approximately 65 percent of these occurrences were A-, B-, or C-ranked in quality. White (1994, pp. 2-7) re-evaluated the status of the taxon in April 1994 by visiting each recorded occurrence documented by Evans and Hannan (1990, pp. 19-20) and providing updated ranks and descriptions of habitat conditions. White (1994, p. 4) recorded a decline in rank quality at 41 percent of the occurrences, with some of the occurrences decreasing by two levels of rank quality. Sixty-eight percent of these sites were degraded directly by human-related activities (*e.g.*, house construction, lawn development, removal of grazing). Over 60 percent of the occurrences had quality ranks of "D" or were considered extirpated. A total of 10 new occurrences were discovered during the survey, but all were considered D-ranked.

The last range-wide survey was completed by KSNPC in April and early May of 2004 (White 2004, pp. 1-3). The number of plants and their condition (including flowering and fruiting) and general site conditions were recorded at 50 separate sites, a subset of the known occurrences. The results of these surveys were compared to results of previous surveys conducted in 1990 (Evans and Hannan 1990, pp. 19-20) and 1994 (White 1994, pp. 2-7). Of the 50 occurrences visited in 2004, 37 (74 percent) had decreased in quality since 1994. This decrease in quality was due to a reduction in the number of plants and commonly an accompanying decline in habitat quality as the character of the area changed from rural to residential. Of those that declined, 13 occurrences (26% of the total) were completely eliminated (extirpated). Of the five sites that were identified as the best remaining conservation targets in the 1994 survey, two had been eliminated and were no longer good candidate sites for restoration.

Based on the most current monitoring and distributional data compiled by KSNPC (White 2009, pers. comm.), we now believe the variety is limited to 57 extant occurrences (Table 1). A total of 26 occurrences are considered extirpated or were not located by KSNPC during the most recent surveys in 2004, 2005, and 2006 (Deborah White 2009, pers. comm.). Thirty-nine of the 57 extant occurrences (68 percent) are of poor quality (D-rank). Occurrence ranks of all known sites are listed below.

Table 1. 2007 Status Ranks for Kentucky Gladecress

Rank	Viability	# Occurrences
A	Excellent	2
B	Good	7
C	Fair	9
D	Poor	39
F	Not Located	8
X	Extirpated	18
	TOTAL	**83**

*Note: For the purposes of this status assessment, we define an "occurrence" as a cluster of plants within a single geographic location that is separated from other such groups by unsuitable habitat or a minimum distance of approximately 1 km. All subsequent discussions using the term "occurrence" in this assessment will be based on this definition. The number of populations of gladecress in Bullitt and Jefferson Counties is roughly equal to the number of occurrences, but the exact number of populations is unknown because no information is available on species dispersal rates and mechanisms, either by seed, pollinators, or some other method.

THREATS

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>.

The entire range of the variety is currently undergoing rapid residential and commercial development as the greater Louisville metropolitan area expands southward into southern Jefferson and northeastern Bullitt Counties. New residential developments are being added throughout the variety's range, along with associated road and utility construction. From 1990 to 2000, Bullitt County's population increased by 28.7 percent, a significant increase compared to Kentucky's overall average growth rate of 9.7 percent (SSDAN 2007, p. 1). This elevated growth rate continued from 2000 to 2006, when the county's population grew by 19 percent, almost four times greater than Kentucky's average growth rate of 4 percent (U.S. Census Bureau 2007, p. 1). The population growth of Jefferson County seems to have stabilized over the last twenty years (U.S. Census Bureau 2007, p. 1), but much of the farmland in southern Jefferson County that contains suitable gladecress habitat has already been converted to residential or commercial land use (White 2009, pers. comm.).

Within Bullitt and Jefferson Counties, activities associated with residential and commercial development (*e.g.*, tree-clearing, grading, paving, sod farms) have destroyed and/or significantly degraded the preferred natural glade habitats for the Kentucky gladecress and have left the majority of known occurrences occupying moderately to severely degraded sites, such as roadside rock outcrops, lawns, and heavily grazed pastures. The few remaining "natural" populations (those occurring in somewhat natural glades) are privately owned, unprotected, and

severely threatened by the same development pressures that have degraded or destroyed other habitats.

Within marginal habitats (*e.g*., pastures, roadsides, lawns), periodic disturbance from activities such as mowing, spraying, plowing, or grazing can slow down natural succession and maintain the open, early successional conditions favorable to populations of this variety. However, plowing, mowing, or herbicide treatment prior to seed set and dispersal can be detrimental to populations because this reduces the amount of seed available for the next year. Furthermore, heavily grazed pastures retard the natural growth of the variety and can create unfavorable conditions (*e.g*., soil compaction, soil eutrophication) that inhibit successful growth and reproduction. In addition, the introduction and spread of nonnative species and forage grasses associated with agriculture and land disturbance can eventually decimate populations due to the gladecress' poor competitive abilities and shade intolerance.

In summary, habitat loss and modification represent significant threats to the Kentucky gladecress. Within Bullitt and Jefferson Counties, activities associated with residential and commercial development (*e.g*., tree-clearing, grading, paving, sod farms) have destroyed and/or significantly degraded the preferred natural glade habitats for the Kentucky gladecress and have left the majority of known occurrences occupying moderately to severely degraded sites, such as roadside rock outcrops, lawns, and heavily grazed pastures. The few remaining "natural" populations (those occurring in somewhat natural glades) are privately owned, unprotected, and severely threatened by the same development pressures that have degraded or destroyed other habitats. In addition, the introduction and spread of nonnative species and forage grasses associated with agriculture and land disturbance can eventually decimate populations due to the gladecress' poor competitive abilities. Furthermore, these threats are considered to be imminent as development and land conversion within Bullitt County continues indefinitely and metropolitan Louisville expands, thereby perpetuating these impacts. As a result of the imminence of these threats, combined with the vulnerability of the remaining small populations to extirpation from natural and manmade threats, we have determined that the present or threatened destruction, modification, or curtailment of the Kentucky gladecress habitat and range represents a significant threat of high magnitude.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
There is currently no known overutilization of the Kentucky gladecress for any of these purposes. This listing factor does not represent a threat to the species.

C. Disease or predation.
Based on field observations by KSNPC staff, this listing factor does not represent a threat to Kentucky gladecress (White 2009, pers. comm.).

D. The inadequacy of existing regulatory mechanisms.
The KSNPC has designated the Kentucky gladecress as endangered within Kentucky, but this designation conveys no legal protection to the variety. No other state or federal regulatory mechanisms are in place to afford protection to the Kentucky gladecress. In summary, because of the vulnerability of the small remaining populations of the species and the imminence of these

threats, we find the inadequacy of existing regulatory mechanisms to be a significant threat of high magnitude.

E. Other natural or manmade factors affecting its continued existence.

Winter annuals, such as Leavenworthia exigua var. laciniata, are excluded from many habitats because they are poor competitors (Evans and Hannan, p. 14). The most vigorous populations of the variety occur in areas with shallow, rocky soils and widely fluctuating moisture regimes. Under natural conditions, cedar glades are maintained edaphically (a result of soil conditions) through drought and erosion. The shallow soil, exposed rock, wet spring periods, and frequent hot, dry summers create alternating wet and dry conditions that keep competition and/or shading effects of encroaching vegetation in check (Evans and Hannan 1990, pp. 9-10). In areas with deeper soils, periodic disturbance is needed to arrest succession and perpetuate suitable habitat. This is less important in areas with rock outcrops, because these areas are maintained by recurring drought and natural erosion.

The restricted range and declining numbers observed at many occurrences makes the variety more isolated geographically and potentially less genetically diverse. Low numbers and geographic isolation would limit the natural interchange of genetic material within and between populations, resulting in decreased genetic diversity and long-term species viability (Soule 1980, pp. 157-164; Hunter 2002, pp. 97-107).

Therefore, we have determined that the imminence of other natural and manmade factors, such as small, isolated populations and low genetic diversity, combined with localized extinctions from land disturbance, habitat modification, and interactions with invasive species, threaten remaining populations of the Kentucky gladecress. The magnitude of these threats is high.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

Periodic monitoring of known occurrences and searches for new sites are conducted by KSNPC on a three- to five-year rotation. Previous conservation efforts by KSNPC have included the preparation of a Kentucky gladecress fact sheet that was distributed to local schools, extension offices, and government offices and further publicized by local newspapers in Bullitt and Jefferson Counties (Pioneer News and Courier Journal). KSNPC has also (1) worked successfully with the Kentucky Transportation Cabinet and Federal Highway Administration to secure a 24-acre conservation easement for a gladecress occurrence (Apple Valley) in Bullitt County; (2) secured Landowner Incentive Program (LIP) funds for cedar tree removal at an A-ranked occurrence (Rocky Run) in Bullitt County; and (3) assisted Future Fund, Inc., a local land trust in Jefferson County in securing conservation easements from the county for at least one gladecress sites (White 2009, pers. comm.). During 2010, the KFO and KSNPC plan to work cooperatively with 21st Century Parks, a Kentucky-based, non-profit corporation, to conserve and/or protect several occurrences located on their properties in southern Jefferson County.

One of the highest ranked gladecress occurrences is located on Pine Creek Barrens Preserve, a 110-acre property in eastern Bullitt County owned and managed by TNC (TNC 2007, p. 1). Recent conservation efforts on this preserve have included prescribed burns and the removal of invasive plants.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

As demonstrated by the threats analysis above, there are threats to the gladecress as a result of Listing Factors A (the present or threatened destruction, modification, or curtailment of its habitat or range), D (the inadequacy of existing regulatory mechanisms), and E (other natural or manmade factors affecting its continued existence). *Leavenworthia exigua* var. *laciniata* is vulnerable due its small number of quality sites, its limited range, and the increased rate of residential and commercial development throughout its range. Populations of this variety are now located primarily in modified habitats such as pastureland, roadside rights-of-way, and cultivated or plowed fields. These populations are threatened by further habitat destruction (conversion from rural to residential land use), herbicide use, over-grazing, and competition. Some populations continue to occupy natural glade habitats, but these habitats are remnant in nature and continue to be impacted by agricultural and residential conversion. Kentucky state law provides no protection for Kentucky gladecress. The variety has been designated as endangered by KSNPC, but this designation conveys no legal protection. In addition, the variety's poor competitive ability and isolated nature make it vulnerable to invasion by other, more competitive species and may limit its genetic diversity and viability.

We evaluated the threats to the gladecress and considered factors that, individually and in combination, presently or potentially could pose a risk to the Kentucky gladecress and its habitat. Based on our analysis of these threats, we find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES

Additional conservation measures are needed to protect the Kentucky gladecress and its habitat. Monitoring by KSNPC should continue in order to keep track of the variety's status. Habitat remediation and protection efforts should be pursued through land purchase or establishment of conservation easements. These efforts should focus on A- and B-ranked occurrences, but conservation of other occurrences should be pursued when opportunities arise. Cooperative conservation efforts between KFO, KSNPC, Future Fund, Inc., and 21st Century Parks should be continued. Protected sites should be managed to reduce competition and promote favorable habitat conditions. The gladecress fact sheet prepared by KSNPC should be circulated widely in local schools, extension offices, and government offices and further publicized by local newspapers in Bullitt and Jefferson Counties (Pioneer News and Courier Journal). Finally, seed should be collected from sites with no conservation value and stored for future conservation projects.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	2
		Subspecies/population	**3***
	Nonimminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Nonimminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: All extant occurrences of Kentucky gladecress are limited to a small area of northeastern Bullitt and southeastern Jefferson Counties, Kentucky, that is undergoing rapid development and general conversion from rural to residential land use. Most of the variety's preferred natural habitats (cedar glades) have been eliminated, and the variety now generally occupies moderately to severely degraded sites, such as roadside rock outcrops, lawns, and heavily grazed pastures. The few remaining "natural" populations (those occurring in somewhat natural glades) are privately owned, generally unprotected, and severely threatened by the same development pressures that have degraded or destroyed other habitats for the variety (only one occurrence is protected by its location on a preserve owned by TNC and conservation easements have been secured by KSNPC for only one additional occurrence). Since the first status survey was completed in 1990, the number of extant occurrences has decreased and the overall viability (rank) of occurrences has also declined. Collectively, these factors are serious and significant impediments to the survival of the Kentucky gladecress. The variety's primary threat, habitat destruction due to residential and commercial development, is widespread and has the potential to affect the entire range of the variety. The effects of the threat are also permanent. Therefore, we conclude that these threats are "High" in magnitude.

Imminence: The conversion from rural to residential land use in northeastern Bullitt and southeastern Jefferson Counties will likely continue for the foreseeable future. Bullitt County has experienced unprecedented growth over the last 15 years, with population increases well above that of the State average. As the Louisville metropolitan area continues to expand, undeveloped portions of southern Jefferson and northeastern Bullitt Counties will continue to be

attractive to developers and, consequently, residential and commercial growth will continue. Therefore, we conclude that these threats are "Imminent."

Rationale for Change in Listing Priority Number (insert if appropriate)

__X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No

DESCRIPTION OF MONITORING

The KSNPC completed range-wide surveys for the species in 1990, 1999, and 2004, and selected sites were visited and evaluated in other years. Periodic monitoring of known occurrences and searches for new sites will be conducted by KSNPC on a three- to five-year rotation (White 2009, pers. comm.).

COORDINATION WITH STATES

All information obtained for this status review was obtained from KSNPC and peer-reviewed scientific literature. No other specific coordination on the variety was conducted with the Commonwealth of Kentucky. The species was not included as part of Kentucky's State Wildlife Action Plan (KDFWR 2005, p. 2.2.1). Plants were not included in the plan.

LITERATURE CITED

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the variety before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: 

_____ June 15, 2010

for Regional Director, Fish and Wildlife Service Date

Concur: _____ _____

Director, Fish and Wildlife Service Date

Do not concur: _____ _____

Director, Fish and Wildlife Service Date

Director's Remarks:

Date of review: March 17, 2010

Conducted by: Dr. Michael A. Floyd
Kentucky Field Office